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2. The Abstract of the disclosure has been revised to comply with 5 of the Office communication.
3. The Specification has been revised to incorporate the corrections required in 6 of the Office communication.
4. The claims of record have all been rewritten and replaced with new claims 10 to 17 in order to define the invention more particularly over the cited references and to satisfy 7 through 18 of the Office communication.
5. Other revisions have been made in the Specification including the addition of a statement in the Description of the Prior Art section to cover the patent cited by the Examiner and the revision of the description of the invention to fully, clearly and accurately describe the invention over the prior art. Applicant submits that the revisions do not add new matter to the application.

#### RESPONSES TO CLAIM OBJECTIONS AND REJECTIONS

6. In response to 7 of the Office communication, the new dependent claims refer to other claims in the alternative only.
7. In response to 9 of the Office communication, the new independent claim includes "does not exceed the dew point temperature of the gas" as a limitation.
8. In response to 10-14 of the Office communication, Applicant requests the deletion of the paragraphs covering the corresponding structure, material or acts for "cooling means", "cleaning means" and "injector means" from the Specification to comply with 35 U.S.C. Section 112, sixth paragraph. Applicant believes deleting the paragraphs from the Specification will also broaden the application.
9. In response to 15-17 of the Office communication, Applicant provides the following:

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(A) The claims of record have all been rewritten and replaced with new claims. The new claims are all submitted to be patentable over the prior art because (i) they recite novel structure and thus distinguish physically over every reference ( 35 U.S.C. Section 102); (ii) they are unobvious and are not anticipated by any prior art ( 35 U.S.C. Section 103); and (iii) the physical distinctions produce new and unexpected results, solve a long-felt, long-existing, but unsolved need, and effect a new principle of operation.

(B) The cited and relied-upon Ashley et al. disclose processes of desulfurizing a hot flue gas by spray drying in a tower followed by removing means for removing suspended particles: an electroprecipitator (see claim 10 of Ashley et al.) or a bag filter (see claim 12 of Ashley et al.). The present invention discloses a process which removes sulfur compounds and particulates from a gas **concurrently** inside an enclosure. Such feature eliminates the need for a separate particulate collector or "removing means". Hence, the present invention distinguishes physically from Ashley et al., under 35 U.S.C. Section 102.

(C) The cited and relied-upon Ashley et al. utilize a "liquid" comprised by an aqueous solution of sodium carbonate or lime, i.e., a controlled mixture of chemical reagent and water. The present invention utilizes a mixture of chemical reagent and water (see new claim 1) wherein the amount of chemical reagent and the amount of water are controlled separately (see new dependent claims 16 and 17). Applicant did not specify the stoichiometric ratio because such ratio will depend on several factors including desired removal efficiency, type of chemical reagent and gas properties. Applicant submits that in any industrial or commercial chemical process some form of control should be used. For the present invention to function properly, a chemical reagent supply flow control means (see new dependent claim 16) and a water supply flow control means (see new dependent claim 17) are necessary. The need for a separate water supply flow control means

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is further explained in (H) below. Hence, the present invention is not anticipated by Ashley et al. and should be considered unobvious under 35 U.S.C. Section 103.

(D) In 8 above, Applicant requested the deletion of the following paragraph which describes "injector means" from the Specification to comply with U.S.C. Section 112, sixth paragraph: "Chemical reagent and water injection systems are common in the industry and can be designed and manufactured using known engineering principles and manufacturing processes, respectively."

(E) The cited and relied-upon Ashley et al. recite four deflector vanes for directing a proportion of the gas inwardly towards the axis of the spray tower. The new claims no longer recite the compelling of the gas to interact with a solid surface. "Compelling the gas" is still mentioned in the Specification but no corresponding structure or material was specified.

(F) In 8 above, Applicant requested the deletion of the paragraph describing "cleaning means" to comply with 35 U.S.C. Section 112, sixth paragraph. The deletion should also avoid any misinterpretation between "water is sprayed into the tower" in Ashley et al., and the "cleaning means" in the present invention.

(G) The cited and relied-upon Ashley et al. require the gas exiting the tower to be as close to the dew point consistent with maintaining unsaturation at the stack. The present invention requires the temperature of a solid surface to not exceed the dew point temperature of the gas. One difference between the two requirements is "as close to the dew point while maintaining unsaturation at the stack" can be interpreted as slightly above the dew point while "not exceed the dew point" can be interpreted as significantly below, slightly below or equal to the dew point. Clearly, the present invention excludes temperatures above the dew point temperature of the gas. Hence, the two requirements are different. The other difference between Ashley et al. and the present invention regarding the

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use of "dew point" is Ashley et al., specifically requires the gas exiting the tower to be as close to its dew point while the present invention requires a **solid surface** to have a temperature not exceeding the dew point. Hence, Ashley et al., did not anticipate the present invention. The present invention should be considered unobvious under 35 U.S.C. Section 103.

(H) The cited and relied-upon Ashley et al. require the use of an amount of water which will not cause the gas to be supersaturated because Ashley et al. believe this enhances the efficiency of absorption in the tower and also of the bag filter if used. The present invention requires the use of an amount of water which will not cause the gas to be supersaturated to ensure the gas is relatively dry after undergoing the process and to ensure a partial vacuum will be created due to condensation. If the gas is supersaturated, some suspended water droplets will evaporate after condensation has taken place, thereby negating the partial vacuum. It is clear that the two objectives for not supersaturating the gas are very different. Hence, Ashley et al. did not anticipate the present invention. The present invention should be considered unobvious under 35 U.S.C. Section 103.

(I) As mentioned in (C) above, Applicant did not specify the stoichiometric ratio because such ratio depends on several factors. Ashley et al. disclose tailoring the stoichiometric ratio of absorbent to sulfur dioxide, dependent upon whether sodium carbonate or lime is used. The new claims and the revised Specification no longer recites "an amount of chemical reagent which is a function of sulfur compounds in the gas". Hence, Ashley et al. did not anticipate the present invention. Therefore, the present invention should be considered unobvious under 35 U.S.C. Section 103.

10. In response to 15, 16, and 18 of the Office communication, Applicant provides the following:

(A) The cited and relied-upon Ashley et al. show two distinct methods (see

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independent claims 1 and 2 of Ashley et al.) of treating a gaseous-pollutant-containing gas with an abrasive aqueous liquid followed by removing means for removing suspended particles: an electroprecipitator (see dependent claim 10 of Ashley et al.) or a bag filter (see dependent claim 12 of Ashley et al.). The present invention differs physically from Ashley et al. because (i) it describes sulfur compound and particulate removal wherein the mixture of chemical reagent and water is not necessarily abrasive and (ii) it does not use a separate removing means for removing suspended particles, i.e., sulfur compound removal and particulate removal occur inside an enclosure. Hence, the present invention should be patentable under 35 U.S.C. Sections 102 and 103.

(B) The differences between Ashley et al. and the present invention regarding the use of "the dew point temperature of the gas" are explained in 9(G) above.

(C) Ashley et al. disclose "water is sprayed into the tower by an atomizer 209 and is completely evaporated into the gas to cool it..." as a cooling means for the gas. The "cooling means" in the present invention is for cooling a **solid surface**. Clearly, the objectives of the two cooling means are different. Hence, Ashley et al. did not anticipate the present invention and the invention should be considered unobvious under 35 U.S.C. Section 103. In addition, as stated in 8 above, Applicant requests the deletion of the paragraph describing "cooling means" (as set forth at instant p. 6, fourth paragraph from the bottom) to comply with 35 U.S.C. Section 112, sixth paragraph.

#### ADDITIONAL REMARKS

11. In response to 19 of the Office communication, Applicant agrees that the prior art made of record and not relied upon is pertinent to Applicant's disclosure and that the references are cumulative to or less material than Ashley et al..

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12. The new independent claim, and hence all claims, distinguishes over the prior art under 35 U.S.C. Section 102 because it recites a process that concurrently removes sulfur compounds and particulates inside an enclosure. Such feature eliminates the need for a separate particulate collector such as a bag filter or an electroprecipitator.

### NEW AND UNEXPECTED RESULTS

13. Applicant submits that the above-recited novel features in the independent claim, and hence in all claims, provide new and unexpected results and hence should be considered unobvious under 35 U.S.C. Section 103.

14. Specifically, there is no process in the prior art for concurrently removing sulfur compounds and particulates from a gas such that the gas is relatively dry after undergoing said process and without using a separate particulate collector.

### SOLUTION OF LONG- FELT, LONG-EXISTING AND UNSOLVED NEED

15. Applicant submits that the above-recited novel features in the independent claim, and hence in all claims, provide a solution to a long-felt, long-existing, and unsolved need and hence should be considered unobvious, making the claims patentable under 35 U.S.C. Section 103.

16. Specifically, by concurrently removing sulfur compounds and particulates from a gas in an enclosure, the need for a separate particulate collector is eliminated. Not needing a separate particulate collector solves a long-felt, long-existing and unsolved need of reducing the first cost and operating cost of sulfur compound and particulate collection equipment.

### NEW PRINCIPLE OF OPERATION

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17. Applicant submits that the above-recited novel features in the independent claim, and hence in all claims, effect a new principle of operation and therefore should be considered unobvious, making the claims patentable under 35 U.S.C. Section 103.
18. Specifically, by using the fly-trap effect enhanced by the partial vacuum caused by condensation, a new principle of operation for collecting suspended particles in a gas has been identified. Applicant has blazed a trail, rather than followed one.

#### CROWDED ART

19. The present invention is in a crowded art. Therefore, even a small step forward is worthy of patent protection. While the present invention is submitted to be far more than a small step forward, nevertheless this factor militates in the Applicant's favor.

#### REQUEST FOR CONSTRUCTIVE ASSISTANCE

20. The undersigned is very grateful for the constructive comments and suggestions by the Examiner. Diligent effort has been made to amend the claims of this application so that they define novel structure which is also submitted to render the claimed process unobvious because it produces new and unexpected results; solves a long-felt, long-existing, but unsolved need; and effects a new principle of operation. If for any reason, the claims of this application are not believed to be in full condition for allowance, Applicant respectfully requests the constructive assistance and suggestions of the Examiner in drafting one or more acceptable claims pursuant to MPEP 707.07(j) or in making constructive

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suggestions pursuant to MPEP 706.03(d) in order that this application can be placed in allowable condition as soon as possible without the need for further proceedings.

Very respectfully yours,

  
Ronald F. Balingit

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